FEB 2 4 2014

510(k) Summary of Safety and Effectiveness

Summary Date: February 21, 2014

Submitter: CeloNova BioSciences, Inc.
18615 Tuscany Stone, Ste. 100
San Antonio
Texas 78258, USA

Contact: Nicole C. Barber
Manager, Regulatory Affairs

1. Common name, Trade name & Classification of Subject Device

Trade Name:	Embozene® Microspheres
Common Name(s):	Vascular Embolization device, embolization, arterial
Product Code:	NAJ, KRD, 21 CFR 870.3300
Classification:	Class II (special control)

2. 510(k) Numbers and Product Codes of Predicate Devices

Trade Name:	Embozene® Microspheres
Manufacturer:	CeloNova BioSciences, Inc.
510(k) Number:	K073417/ K132675
Product Code:	KRD, 21 CFR 870.3300

Trade Name:	Embosphere® Microspheres
Manufacturer:	BioSphere Medical, Inc. (Acquired by Merit Medical Systems, Inc.)
510(k) Number:	K021397
Product Code:	NAJ, 21 CFR 870.3300

Trade Name:	Contour® PVA Embolization Particles
Manufacturer:	Boston Scientific Corporation

510(k) Number: K030966

Product Code: NAJ, 21 CFR 870.3300

3. Indications for Use and Intended Purpose

Embozene® Microspheres are intended for embolization of arteriovenous malformations, and hypervascular tumors, including uterine fibroids.

4. Device Description

Embozene® Microspheres are tightly calibrated, compressible microspheres intended to occlude vasculature for the purpose of blocking blood flow to a target tissue such as a hypervascular tumor (HVT) or arteriovenous malformation (AVM). Embozene® Microspheres are manufactured from sodium polymethacrylate and coated with proprietary Polyzene®-F. The microspheres are compressible to enable smooth delivery through the indicated delivery catheter. Embozene® Microspheres are color coded by size to allow easy identification of the different sizes.

Embozene® Microspheres are supplied sterile and packaged in 20ml polycycloolefin syringes with a standard 7ml fill volume across the range. Embozene® Microspheres syringes or vials are available in 1 ml or 2 ml microsphere volume. Product configurations are shown in the following tables.

Product REF Codes for Embozene® Color-Advanced Microspheres in Syringe and Vial

Product REF Codes Embozene® Color-Advanced Microspheres		***Volume of Embozene® Color-Advanced Microspheres per Syringe***		***Volume of Embozene® Color-Advanced Microspheres per Vial***	
Nominal Size	Specifications	1ml	2ml	1ml	2ml
40 µm	40 µm ±10 µm	10410-S1	10420-S1	10401-V1	10402-V1
75 µm	75 µm ±15 µm	10710-S1	10720-S1	10701-V1	10702-V1
100 µm	100 µm ±25 µm	11010-S1	11020-S1	11001-V1	11002-V1
250 µm	250 µm ± 50 µm	12010-S1	12020-S1	12001-V1	12002-V1
400 µm	400 µm ± 50 µm	14010-S1	14020-S1	14001-V1	14002-V1
500 µm	530 µm ± 50 µm	15010-S1	15020-S1	15001-V1	15002-V1
700 µm	700 µm ± 50 µm	17010-S1	17020-S1	17001-V1	17002-V1
900 µm	900 µm ± 75 µm	19010-S1	19020-S1	19001-V1	19002-V1
1100 µm	1100 µm ± 75 µm	111010-S1	111020-S1	111001-V1	111002-V1
1300 µm	1300 µm ± 75 µm	113010-S1	113020-S1	113001-V1	113002-V1

Product REF Codes for Embozene® Opaque (Non-Colored) Microspheres in Syringe and Vial

Product REF Codes Embozene® Opaque Microspheres		***Volume of Embozene® Opaque Microspheres per Syringe***		***Volume of Embozene® Opaque Microspheres per Vial***	
Nominal Size	Specifications	1ml	2ml	1ml	2ml
40 µm	40 µm ±10 µm	10410-S0	10420-S0	10401-V0	10402-V0
75 µm	75 µm ±15 µm	10710-S0	10720-S0	10701-V0	10702-V0
100 µm	100 µm ±25 µm	11010-S0	11020-S0	11001-V0	11002-V0
250 µm	250 µm ± 50 µm	12010-S0	12020-S0	12001-V0	12002-V0
400 µm	400 µm ± 50 µm	14010-S0	14020-S0	14001-V0	14002-V0
500 µm	530 µm ± 50 µm	15010-S0	15020-S0	15001-V0	15002-V0
700 µm	700 µm ± 50 µm	17010-S0	17020-S0	17001-V0	17002-V0
900 µm	900 µm ± 75 µm	19010-S0	19020-S0	19001-V0	19002-V0
1100 µm	1100 µm ± 75 µm	111010-S0	111020-S0	111001-V0	111002-V0
1300 µm	1300 µm ± 75 µm	113010-S0	113020-S0	113001-V0	113002-V0

Only microspheres of 500 µm or greater should be used for embolization of uterine fibroids.

5. Similarities and Differences Compared to Predicate Devices

To demonstrate substantial equivalence, CeloNova has identified two legally marketed predicate devices; Embozene® Microspheres cleared through 510(k)s (K073417 and /K132675 and Merit Medical's Embosphere® Microspheres cleared through 510(k) K021397. The Embozene® Microspheres that are the subject of this 510(k) are the same as the legally marketed Embozene® Microspheres, previously cleared by FDA, in regard to intended use and technological characteristics. The only difference between the subject of this 510(k) and our legally marketed predicate devices relates to the indications for use statement. The indications for use statement related to this 510(k) includes greater specificity than our predicates by explicitly identifying "uterine fibroids" as being among the tumors treated with vascular embolization devices, as established by 21 CFR § 870.3300.

In comparison to the second predicate device, Merit Medical's Embosphere® Microspheres (K021397), the intended use of the subject device is the same. Furthermore, the subject device and the predicate have the same design, specifications, fundamental scientific technology, and packaging.

In comparison to the third predicate device, Boston Scientific's Contour® PVA Embolization Particles (K030966), the intended use of the subject device is the same.

6. Summary of Technological Characteristics

Comparison between the Subject Device (Embozene®) and the Primary Predicate Device (Embozene®)

	Subject Embozene® Microspheres	**Predicate Embozene® Microspheres**
Administrative Elements		
Manufacturer	CeloNova BioSciences, Inc.	Same
Premarket Notification	K133447	K073417 and K132675
Classification	Class II (special controls)	Class II (special controls)
Classification Regulation	21 CFR 870.3300	21 CFR 870.3300
Product Code	NAJ- Agents, Embolic, For Treatment Of Uterine Fibroids	KRD - Device, Vascular, For Promoting Embolization
	KRD - Device, Vascular, For Promoting Embolization	
Intended Use		
Indications for Use Statement	Embozene® Microspheres are intended for embolization of arteriovenous malformations and hypervascular tumors, including uterine fibroids.	Embozene® Microspheres are intended for embolization of hypervascular tumors and arteriovenous malformations.
Method of Delivery	Microcatheter under fluoroscopic visualization with contrast	Same
OTC or Rx	Rx	Same
Technological Characteristics		
Mechanism of Action	Mechanical Occlusion	Same
Material Class	Crosslinked polyacrylate hydrogel	Same
Material Design	Spherical	Same
Material Composition	Crosslinked polyacrylate hydrogel with Polyzene-F	Same

Sizes [µm]	40 ± 10 75 ± 15 100 ± 25 250 ± 50 400 ± 50 530 ± 50 700 ± 50 900 ± 75 1100 ± 75 1300 ± 75	Same
Biocompatibility of patient-contacting materials	Yes	Same
Microsphere Volume [ml]	1 or 2	Same
Sterility Assurance Level	Supplied sterile to SAL 10^{-6}	Same
Pyrogen-free	Yes	Same
Packaging	Syringe or vial	Same
Shelf-life	3 years	Same

7. Summary of Non-Clinical Performance Testing

There are no performance standards applicable to the device. The device is subject Guidance for Industry and FDA Staff – Class II Special Controls Guidance Document: Vascular and Neurovascular Embolization Devices issued on December, 29 2004. The following non-clinical performance testing was conducted on the primary predicate device:

- Chemical analysis
- Size range
- Catheter compatibility
- Density
- Packaging performance
- Shelf Life
- Sterility
- Biocompatibility

No new testing was conducted since the primary predicate device and the subject device have identical technological characteristics, manufacturing, processing, and sterilization.

Bench testing was conducted to compare Embozene® Microspheres with the predicate Embosphere®.

8. Summary of Clinical Experience

The clinical information submitted included a review of embolization using various embolic agents to physically occlude vessels to restrict blood flow over the last ten years, published and unpublished data on the use of use of Embozene® for the treatment of uterine fibroids (outside the United States) and postmarket experience with the cleared device.

The published data provided included a study conducted by Smeets et al. [Ref.: Smeets AJ, Nijenhuis RJ, van Rooij WJ et al. Embolization of uterine leiomyomas with Polyzene F-coated hydrogel microspheres: initial experience. JVIR 2010; 21(12): 1830-1834]. This study included data on fibroid-specific outcomes using the Uterine Fibroid Symptom Quality of Life (UFS-QOL) patient reported outcomes instrument. It also evaluated the uterine and fibroid volume and percent fibroid infarction as determined by MRI. A fibroid-specific quality of life outcomes instrument was used as the primary clinical outcome measure in a previously-cleared device with this indication (i.e., Boston Scientific Contour Emboli PVA, K030966). Results from the Smeets et al. study demonstrated that mean fibroid symptom severity scores on the UFS-QOL instrument dropped from 64 at baseline to 23 at three months (n=85). (A reduction in score constitutes an improvement in patient symptoms.) At a mean follow-up of 12.8 months, mean uterine fibroid symptom severity scores were 16 (n=81). At three months, the mean volume reduction of the dominant fibroid was 45% and the mean volume reduction of the entire uterus was 42%. At three months, there was a 94% rate of >90% infarction of the dominant fibroid and a 91% rate of >90% infarction of the total fibroid load. Regarding adverse events, one subject underwent hysterectomy at two months due to incomplete fibroid expulsion, and two subjects had hysterectomy at five- and seven-months post-procedure due to persistent pain.

Review of published and unpublished data regarding adverse events associated with Embozene® Microspheres did not identify any unique safety concerns regarding use of Embozene® Microspheres for uterine fibroid embolization.

9. Conclusion

The Embozene® Microspheres that are the subject of this 510(k) submission are substantially equivalent to the primary predicate device (Embozene® Microspheres, K073417 and K132675) and the second predicate device (Embosphere® Microspheres, K021397) based on intended use, technological characteristics, and bench performance data. The Embozene® Microspheres that are the subject of this 510(k) submission are substantially equivalent to the third predicate device (Contour® PVA Embolization Particles, K030966) based on intended use and clinical performance data.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

February 24, 2014

CeloNova BioSciences, Inc.
Nicole C. Barber
Manager, Regulatory Affairs
18615 Tuscany Stone Suite 100
San Antonio, TX 78258

Re: K133447
Trade/Device Name: Embozene® Microspheres
Regulation Number: 21 CFR§ 870.3300
Regulation Name: Vascular embolization device
Regulatory Class: II (special controls)
Product Code: NAJ, KRD
Dated: November 25, 2013
Received: November 26, 2013

Dear Nicole C. Barber,

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies.
You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of

medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please go to http://www.fda.gov/AboutFDA/CentersOffices/CDRH/CDRHOffices/ucm115809.htm for the Center for Devices and Radiological Health's (CDRH's) Office of Compliance. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Herbert P. Lerner -S

for
Benjamin R. Fisher, Ph.D.
Director
Division of Reproductive, Gastro-Renal,
and Urological Devices
Office of Device Evaluation
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: January 31, 2017
See PRA Statement on last page.

510(k) Number *(if known)*

K133447

Device Name

Embozene® Microspheres

Indications for Use *(Describe)*

Embozene® Microspheres are indicated for the embolization of arteriovenous malformations and hypervascular tumors, including uterine fibroids.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

PLEASE DO NOT WRITE BELOW THIS LINE – CONTINUE ON A SEPARATE PAGE IF NEEDED.

FOR FDA USE ONLY

Concurrence of Center for Devices and Radiological Health (CDRH) *(Signature)*

Herbert P. Lerner -S
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